but if this be the case, two years seems a too generous allowance of time to be occupied in passage through the press, to the exclusion of belated additions, even in the case of an elaborate monograph such as that under review. The volume of text concludes with a full and well-planned index, while there is the useful luxury of a second index at the end of the volume of plates.

Special praise must be accorded to the plates, upwards of 100 in number, which illustrate this work. These are well reproduced in collotype process from beautifully executed drawings, mainly by Miss Frances Wieser, of the United States Geological Survey. The careful and detailed work of the artist is a fine achievement. To many who have little acquaintance with the Cambrian brachiopods beyond the scanty assemblage found in our own country, the perusal of this volume of plates will prove a revelation. It is indeed astonishing to find that such a profusion of species had been evolved and such elaborate specialisation had been attained by many of them in those remote ages. One can only picture in imagination the long and slowly evolving lines of precursors of which no trace has yet been found.

Dr. Walcott deserves the warmest thanks of all palæontologists and geologists for a treatise which must long remain a classic. The public department which has issued the work in such handsome form is also to be congratulated. What higher service can such a department perform than thus to give practical encouragement to arduous scientific labour? F. L. K.

THE TRANSMISSION OF PLAGUE BY FLEAS.

THE third Plague Supplement of the *Journal of Hygiene* maintains the high standard both of research and of editing set by the previous numbers. It contains eight good articles, chiefly by S. Rowland and R. St. John Brooks, on the bacteriology of plague and by A. W. Bacot on the rat flea. The former articles deal with the influence of cultivation in serum-containing media upon the virulence and immunising properties of the plague bacillus; upon the facility with which it is ingested by human leucocytes; and upon its virulence—all points of importance in regard to bacteriology in general. Mr. Bacot's most laborious and well-set-out researches upon the influence of temperature and humidity upon the pathophores and on the effect of vapours as insecticides deserve much commendation; but perhaps the most interesting article is by him and Prof. C. J. Martin on the mechanism and transmission of plague by fleas. They sum up a very careful paper by the following remarks:—

"Under conditions precluding the possibility of infection by dejecta it was found that two species of rat fleas, *Xenopsylla cheopis* and *Ceratophyllus fasciatus,* fed upon septicæmic blood, can transmit plague during the act of sucking, and that certain individuals suffering from a temporary obstruction at the entrance to the stomach were responsible for most of the infections obtained, and probably for all. In a proportion of infected fleas the development of the bacilli was found to take place to such an extent as to occlude the alimentary canal at the entrance to the stomach. The culture of pest appears to start in the intercellular recesses of the proventriculus, and grows so abundantly as to choke this organ and extend into the œsophagus. Fleas in this condition are not prevented from sucking blood as the pump is in the pharynx, but they only succeed in distending an already contaminated œsophagus, and, on the cessation of the pumping act, some of the blood is forced back into the wound. Such fleas are persistent in their endeavours to feed, and this renders them particularly dangerous." R. R.

NOTES.

WE announce with deep regret the death on March 16, as the result of a motor accident, of Sir John Murray, K.C.B., F.R.S., the distinguished naturalist and oceanographer.

THE Right Hon. Sir Francis Hopwood has been appointed by the president and council of the Royal Society to a seat on the general board and executive committee of the National Physical Laboratory, in succession to Sir Arthur Rücker, F.R.S., resigned.

WE notice with regret a Reuter message from New York reporting the death on March 16 of Prof. E. S. Holden, director of the Lick Observatory from 1888 to 1898, and author of a number of papers and other works on astronomical subjects.

THE death is announced, on March 7, at seventy-three years of age, of Prof. Antonino Salinas, professor of archæology at the University of Palermo and director of the Archæological Museum.

PROF. J. G. ADAMI, F.R.S., Strathcona professor of pathology and bacteriology, McGill University, Montreal, has been awarded the Fothergill gold medal of the Medical Society of London for 1914, for his work on pathology and its application to practical medicine and surgery.

THE death is announced, in his sixty-seventh year, of Dr. E. J. Houston, one of the inventors of the Thomson-Houston system of arc lighting. He was twice elected president of the American Institute of Electrical Engineers, and was the author of more than fifty books, mainly on electricity and allied subjects.

PROF. F. KEEBLE, F.R.S., professor of botany, University College, Reading, has been appointed director of the Royal Horticultural Society's garden at Wisley, with the view of making it of more general practical service. Mr. F. Chittenden will remain in charge of the educational section, and Mr. S. T. Wright will continue to act as superintendent of the garden.

MISS A. CANNON, whose critical examination of Harvard College Observatory photographs has led her to the discovery of many new variable stars and other objects of interest, has been elected an honorary member of the Royal Astronomical Society. At the meeting of the society on Friday last, the president, Major E. H. Hills, in announcing the council's decision, remarked that Miss Cannon had acquired remarkable skill in distinguishing the type to which a star spectrum belongs and had completed the classification of 150,000 stars in this way.

Mr. Marconi appears to have secured some remarkable results with his new wireless telephonic apparatus. According to the daily newspapers, experiments have been carried out from Italian warships off the Sicilian coast, and on one occasion signals were received from Canada, 4062 miles away, by means of wireless telephony. In another experiment communication was set up between two ships forty-five miles apart, and the connection continued uninterruptedly for twelve hours. On March 14 the wireless telegraphic station at Nauen, near Berlin, exchanged clear signals with the Windhuk station in German South-West Africa, a distance of more than 6000 miles.

We regret to announce the death, on March 15, of Dr. Harry Burrows, senior lecturer on chemistry at the Sir John Cass Technical Institute, at the early age of forty-two. Dr. Burrows received his academic training at the Royal College of Science and at Heidelberg University, and was a research scholar and subsequently an assistant demonstrator at the Royal College under Sir William Tilden. For the past ten years he had been on the staff of the Sir John Cass Technical Institute, where his successful work as a teacher was valued and appreciated both by the governors of the institute and by the students. Dr. Burrows contributed several papers to the Transactions of the Chemical Society.

The Faraday Society has arranged a general discussion on optical rotatory power, to be held in the afternoon and evening of Friday, March 27, in the rooms of the Chemical Society, Burlington House, London, W. Prof. H E. Armstrong will preside at the afternoon session, and will deliver an introductory address. Prof. Percy F. Frankland will preside at the evening session. Papers on various aspects of the subject will be read by Prof. Hans Rupe (Basle), Prof. H. Grossmann (Berlin), Prof. Leo Tschugaeff (St. Petersburg), Dr. Darmois (Paris), Dr. T. M. Lowry, Mr. T. W. Dickson, Mr. H. H. Abram, Dr. R. H. Pickard, Mr. J. Kenyon, and Dr. T. S. Patterson.

The Royal Society for the Protection of Birds has issued a manifesto signed by the president (the Duchess of Portland) and other ladies of distinction in favour of the Importation of Plumage Prohibition Bill now before Parliament. The manifesto says:—"The present Bill is the result of careful and prolonged investigations. The export of the plumage of wild birds has been prohibited from India, and from the majority of the Crown Colonies. The United States of America and the Commonwealth of Australia have sifted the question, and passed laws prohibiting both export and import. A strong feeling in favour of legislation on these lines is growing in Germany, France, Austria, Holland, Sweden, Denmark, and Belgium. Attempts to regulate the traffic would be futile on account of the insurmountable difficulties with respect to laws and their enforcement in the countries from which a large proportion of the birds come; therefore, the most effectual way to preserve wild birds is by the enactment of laws prohibiting importation in support of the regulations which forbid export."

The report of the Royal Society for the Protection of Birds, presented to the meeting held at the Westminster Palace Hotel on March 5, shows that the growth of the society has been well maintained. Further funds are required if the society is to do the work which lies before it. "The watchers' committee is continually asked to undertake fresh work and accept new responsibilities; educational work could proceed far more rapidly were there funds for its support; it is probable that the work at the lighthouses will demand large additional outlay; and the legislative work before the society for 1914 is the heaviest it has yet had to encounter." The work at the lighthouses, it may be explained, takes the form of erecting rails on which flights of migrants may perch.

Under the powers of the Ancient Monuments Consolidation and Amendment Act, 1913, the following Advisory Boards have been appointed for England, Scotland, and Wales:—*England*—Mr. Lionel Earle (chairman), Lord Burghclere, Lord Crawford, Sir Aston Webb, Mr. R. Blomfield, Sir C. Hercules Read, Mr. C. P. Trevelyan, Prof. F. J. Haverfield, Prof. W. R. Lethaby, Mr. R. A. Smith. *Scotland*—Sir John Stirling-Maxwell, Bart. (chairman), Sir Herbert Maxwell, Bart., Mr. A. O. Curle, Dr. G. Macdonald, the Hon. Sir Schomberg K. McDonnell, Sir James Guthrie, Sir Robert Lorimer, Mr. J. R. Findlay. *Wales*—Sir E. Vincent-Evans (chairman), Lieut.-Col. W. E. Ll. Morgan, Mr. W. Edwards, Sir E. Stafford Howard, Mr. E. Neil Baynes, Prof. R. C. Bosanquet, Dr. W. E. Hoyle, Prof. J. Edward Lloyd. Mr. C. R. Peers, Chief Inspector of Ancient Monuments, is also a member of each board.

The death is announced of Mr. George Westinghouse, the inventor of the air brake. Born at Central Bridge, Schoharie County, New York, in 1846, he was educated at public and high schools, and at Union College, where he graduated Ph.D. The air brake which has made his name famous throughout the world was invented in 1868. It has been computed that Mr. Westinghouse's genius as an inventor has brought into being undertakings with a capital of 130 millions of dollars, giving employment to 50,000 skilled artisans. He founded works in many American centres, as well as in Manchester and London, at Havre, and in Germany, Russia, Austria, and Italy. Among the decorations bestowed on him were the Legion of Honour, the Order of the Royal Crown of Italy, and of Leopold of Belgium. He was also the recipient of the Edison gold medal in 1912, and in the following year of the Grashof gold medal, conferred annually by the engineering profession of Germany in memory of Franz Grashof.

A PARAGRAPH in the *Times* of March 12 records the arrival at the Natural History Branch of the British Museum of a consignment of specimens illustrating the whales of the Antarctic. They were obtained by the museum taxidermist who accompanied the late Major Barrett-Hamilton to South Georgia, and were brought home *gratis* by Messrs. Salvesan, of Leith, their united weight being about 8 tons. The specimens—which represent three species, namely, the blue or Sibbald's rorqual (*Balaenoptera sibbaldi*), the common finner (*B. musculus*), and the southern humpback (*Megaptera lalandei*)—include the whalebone, flippers, a trunk-vertebra, and ear-bones. Plaster casts of the flippers are now being made, which will in due course be placed on exhibition. The blue rorqual was the second largest specimen on record, measuring close on 100 ft. in total length. To this species pertains the aforesaid vertebra, which is of enormous dimensions, largely exceeding those of the vertebræ of the sauropod dinosaurs from the Wealden of the Isle of Wight.

THERE is something reminiscent of a Latin-American frontier dispute in the controversy which has arisen regarding the base in the Weddell Sea of the respective Antarctic expeditions of Sir Ernest Shackleton and Dr. Koenig, but the parallel unfortunately does not hold good so far as to suggest arbitration by an impartial umpire. It is admitted on Dr. Koenig's side that, before his expedition was spoken of, Sir E. Shackleton had expressed in general terms his hope of undertaking a journey from the Weddell Sea to the pole. Dr. Koenig, on the other hand, produced detailed plans before Sir E. Shackleton did so, and the question turns simply on a point of opinion whether the latter's previous general statement gives him a basis of claim to priority, or not. The Royal and Imperial Geographical Society in Vienna has committed itself to the negative opinion, and there the matter appears likely to rest: either side may claim what it will but cannot enforce any claim upon the other; so that so far as concerns work in the Weddell Sea area (for the published statements do not make it clear that a crossing of the Antarctic continent is part of the Austrian, as it is of the British, scheme) science may be compelled to fall back upon any satisfaction and value which it may be possible to derive from a comparison between independent sets of observations in the same field.

THE concluding meeting of the Optical Convention was held on Thursday, March 12, in connection with the meeting of the Optical Society of that date. The report presented contained many points of special interest, conspicuous among which was an experiment made by the Board of Education in accommodating the exhibition of the Optical Convention in the buildings of the Science Museum at South Kensington. The experiment appears to have given complete satisfaction to the committee and members of the convention. We believe that it is regarded as having been successful by the authorities of the museum, and as it is very evident that such an employment, when practicable, of our public museums must tend materially to enlarge their usefulness, it may be hoped that the precedent will not be lost sight of in the future. From another point of view the report must have been equally satisfactory to the members of the convention, for it appears that in the result the committee has been able to wind up the business without making any formal call upon its guarantors. The most important outcome of the convention was the formation of a technical committee charged with the duty of establishing an effective cooperation between the users of scientific instruments on one hand, and the manufacturers of such instruments on the other. The report of that committee, which was the most interesting feature of the proceedings, shows that the committee found some very useful work ready to its hand in connection with a communication from the War Office referring to the standardisation of the cells and other parts of telescopes and binoculars. A sub-committee has been formed to consider the matter, and it is hoped that through the instrumentality of the Optical Society, and with the cooperation of British manufacturers of telescopes and binoculars, the necessary work of standardisation will soon be carried out.

IN connection with the Panama-Pacific International Exposition in San Francisco next year, there will be an International Engineering Congress, during the week September 20–25, 1915, in which engineers throughout the world, representing all branches of the profession, are invited to participate. The congress is to be conducted under the auspices of five engineering societies, namely, the American Society of Civil Engineers, the American Institute of Mining Engineers, the American Society of Mechanical Engineers, the American Institute of Electrical Engineers, and the Society of Naval Architects and Marine Engineers. Colonel G. W. Goethals, chairman and chief engineer of the Isthmian Canal Commission, has consented to act as honorary president of the congress. The general field of engineering to be covered by the congress has been divided into ten groups or branches, which, together with the special field of the Panama Canal, will constitute eleven divisions or sections, as follows:— (1) The Panama Canal; (2) Waterways and Irrigation; (3) Railways; (4) Municipal Engineering; (5) Materials of Engineering Construction; (6) Mechanical Engineering; (7) Electrical Engineering; (8) Mining Engineering and Metallurgy; (9) Naval Architecture and Marine Engineering; (10) Military Engineering; (11) Miscellaneous. The offices of the committee of management of the congress are at Foxcroft Buildings, San Francisco, Cal., U.S.A.

MR. B. QUARITCH, of 11 Grafton Street, London, W., is about to publish an elaborate work entitled "British Flowering Plants," in four volumes, royal quarto, at twelve guineas if ordered before the date of publication, March 28, or fifteen guineas after that date. The main feature of the work consists in three hundred coloured plates, reproduced from water-colour drawings by Mrs. Perrin. Copies of the first volume of the work, together with the original drawings, and the plates for the book, are on view (March 13-27) at the Dudley Gallery, 169 Piccadilly, where we inspected them on Saturday last, and were equally struck by the beauty of the original drawings and the remarkable fidelity of the plates reproduced from them. Thirty of the plates consist of floral dissections, but those inspected were somewhat too small and lacking in detail to be of much service to the student; such analytical illustrations are usually better done in black and white, except where they are on a large scale, as in the well-known coloured sections of flowers given in Dr. Church's "Types of Floral Mechanism." The British flowering plants are receiving a large amount of attention from artists and photographers at the present time, and the appearance of so many attractive books is a welcome sign of increasing interest in our wild flowers, while it should swell the numbers of field naturalists.

Mr. Arthur MacDonald, of Washington, D.C., has sent us a leaflet entitled "The Study of Man," the object of which is to urge the desirability of laboratories to investigate the bodily and mental characteristics of the criminal, pauper, and defective classes. This leaflet he has sent to the Home Secretary, Mr. McKenna, with a letter directing his attention to the importance of such work as a means of throwing light on the causation of crime, and as likely to furnish a more rational basis for methods of reform. With Mr. MacDonald's object we are in complete agreement, but in fairness to the Home Office it must be said the claims of the anthropological and psychological study of criminals have already met with some official recognition, as is evidenced by the recent publication in the form of a Blue-book of "The English Convict," by Dr. Goring, the deputy-medical officer of Parkhurst Prison. Yet the contents of this memoir are perhaps the most convincing indication that could be brought forward of the need for the establishment of laboratories, each equipped, not necessarily with costly and elaborate apparatus, but certainly with a properly qualified staff. For Dr. Goring's results clearly demonstrate the importance of the problems depending for their solution on work of this nature, while at the same time the poverty of the psychological data which he had at his disposal indicates the need for more advanced experimental work as to the mental nature of criminals.

In the issue of *Man* for March Sir H. H. Johnston discusses the origin of the horse-shoe arch. He suggests that it and the Mahràb, or holy recess, in the Mohammadan mosque, were based on a Phœnician sex-cult introduced into the West by Phœnicians, and that the horse-shoe arch, under their influence, may have arisen independently in southern Spain as it likewise arose in Cœle-Syria and southern Tunis. "But if so," he adds, "it is perplexing to find it as a pre-Islamic feature in Visigothic buildings of *northern* Spain, whither the Phœnician influence can have scarcely penetrated."

Prof. Arthur Keith's discourse on an anthropological study of some portraits of Shakespeare and of Burns, delivered at the Royal Institution on February 20, is printed in the issue of the *British Medical Journal* for February 28. In the case of Shakespeare, Prof. Keith uses a terra-cotta mask recently found in one of the midland counties, the bust in the church at Stratford, and the Droeshout portrait; for Burns a cast of the poet's skull in the possession of Mr. Barrington Nash, and portraits by Raeburn and Nasmyth. Examination of the head of Shakespeare proves him to be a representative example of the short-headed type, not of the early British breed, but of the round-headed race which entered Britain in the Bronze period, about 2000 B.C. His brain capacity was more than 1900 cm., as compared with 1477 in an average Englishman. Burns, on the contrary, represents an exceptional example of the long-headed type, with a brain capacity of 1730 cm., at least 200 cm. above the average of his countrymen. His skull displays a close analogy with those found by Prof. Bryce in Arran cairns. He sprang from families settled round the Firth of Clyde, and he is thus a direct descendant of the long-headed people who lived in England and Scotland during the later Neolithic period. We may call Shakespeare a "Celt" in the sense in which this term is used on the Continent, while Burns comes from the western fringe, usually called "Celtic," but really pre-Celtic. "Is it possible," asks Prof. Keith, "that we may explain the extraordinary difference in the working of their brains by the diversity of their racial origin?"

The third All-India Sanitary Conference, held at Lucknow on January 19–27, was attended by delegates from all parts of India and Ceylon, including the Portuguese possessions. Sir Harcourt Butler, in his presidential address, reviewed the work that is being carried on in the study and practice of Indian sanitation, but pointed out that progress is necessarily slow in a land where the habits and prejudices of centuries are arrayed against the sanitary reformer, and where it is impossible to benefit fully by the discoveries of the secrets of disease and mortality until the people are educated to receive and profit by the results of scientific investigation. An introductory address to the opening meeting of the research section was given by Sir Pardey Lukis, Director-General of the Indian Medical Service, who reviewed the present state of knowledge concerning the etiology and prevention of the more prevalent Indian diseases. A number of important papers were read before the conference, and led to interesting discussions on various problems of sanitation and disease, while affording striking evidence as to the energy and thoroughness with which investigations upon such problems are being carried on by the medical officers of our Indian Empire.

At the last meeting of the Entomological Society of London, a communication was received from Mr. J. C. Hawkshaw on the subject of the cocoon spun by the larva of *Lyonetia clerkella,* a small moth of the family Tineidæ. The cocoon is slung like a hammock between silken threads attached to the surface of a leaf. On each side of the area bounded by the supporting threads, a fine web is spun 3 or 4 mm. wide, and very loosely attached to the leaf. If any attempt is made to detach the cocoon with the point of a knife or similar instrument, the cocoon and webs become a shapeless mass, which sticks persistently to the point, and is with difficulty transferred to any other object. Mr. Hawkshaw suggests that this structure serves as a protection against ants, which are constantly seen to be searching the trees inhabited by the Lyonetia. An ant wishing to seize the cocoon would first have to wade through the loose, flattened web, which forms an outwork in the defence, and in this its legs would become hopelessly entangled. If the ant ventured further, its head and antennæ would also become entangled, and would carry the whole away with it. The assailant would probably be quite unable to bring its biting apparatus to bear on the cocoon. A specimen was exhibited in illustration, in which the supporting strands and flanking webs were clearly seen.

The list of the zoological gardens of the world drawn up by Capt. S. S. Flower, and apparently published at Cairo by the Egyptian Government, has been revised, and a new issue printed, bearing date January, 1914. Inclusive of a few large private collections, such as that of the Duke of Bedford at Woburn Abbey, the number of establishments of this nature known to the compiler is 166.

According to an illustrated article by Dr. F. A. Lucas in the January number of the *American Museum Journal,* the late Mr. E. T. Booth, whose well-known collection of British birds is now the property of the Corporation of Brighton, has the best claim to be the founder of the plan of exhibiting in museums groups of animals mounted amid artificial imitations of their natural surroundings. He was followed by Mr. Montagu Brown, then curator of the Leicester Museum, and soon after by the late Dr. R. B. Sharpe, in the Natural History Branch of the British Museum, where a group of coots formed the commencement of the splendid series of exhibits which is now the delight of visitors to the bird gallery. The rise and progress of the practice—especially in America—are fully described in the article, of which a continuation is promised.

Papers on various groups of insects from the Philippines and Japan form the greater part of vol. viii., No. 4, of Section D of the *Philippine Journal of Science.* In one of these, dealing with Japanese termites, Mr. Masamitsu Oshima reproves Mr. N. Holmgren for having given new specific names to certain members of that group, previously named by himself in Japanese. Whether technical names proposed in languages unfamiliar in western Europe should be accepted may, perhaps, be open to argument, although it would be somewhat difficult to decide where to draw the line. In papers written in Russian the names of new species and genera are frequently printed in English characters, which at least renders them legible by zoologists of other nationalities. If this was not done in the case of the Japanese papers, the argument for the rejection of the names is strengthened. The names proposed, both by Oshima and Holmgren, were published in 1912, but only the latter appear in the *Zoological Record* for that year, although some of Oshima's publications are quoted in the volumes for 1909 and 1911.

In an article in *The Indian Forester,* December, 1913, p. 568, Mr. H. M. Glover directs attention to the difficulty of protecting the forests of *Pinus longifolia* in the Panjab from disastrous fires. The accumulation in a few years of fallen needles, dead wood, and old grass render such forests very inflammable; and the fires which are inevitable, owing to the carelessness of the natives, are very fierce, and cause much damage. Mr. Glover advocates, as the result of numerous experiments, the running of a slow fire over limited areas in these forests during winter, when the soil covering is much less inflammable than in the hot weather. Such fires do no harm to pines more than 6 in. in diameter, as stems of this size are covered with a protective thick bark. This method has proved very efficacious, the artificial firing being done during December, January, and February, over areas well under control, from which young growth is absent. Burnt-over sections can be artificially seeded, as seedlings come up in profusion when the refuse has been destroyed.

As a supplement to the paper on the monthly and annual rainfall normals at Indian stations (Nature, June 26, 1913), the director-general of observatories has recently published a volume containing averages of the monthly and annual number of rainy days at all stations where records for at least five years are available. For some purposes this summary is perhaps even more valuable than the previous one, as it shows whether the monthly amounts were distributed over several days instead of possibly being due to torrential downpours. In the absence of any discussion of the normals it may be interesting to quote the average annual number of rain-days referring to some of the extreme values at stations quoted in the issue of Nature above-mentioned:—Cherrapunji (Assam), 159·1; Málcompeth (Bombay), 122·3; Launglon (Burma), 145·6; Rújanpur (Panjab), 7·7; Rohri (Bombay), 6·3; Jhatput (Baluchistan), 6·1. The definition given of a rainy day is one on which 0·1 in. or more rain is recorded. This differs materially from the definition for a rainy day in this country, viz., 0·01 in. or more.

The January number of *Le Radium,* which reached us at the beginning of the present month, contains a valuable collection of tables of radio-active constants brought up to date by M. L. Kolowrat. It is proposed to publish the table annually in order to keep readers supplied with the most trustworthy data. References to the original authorities are given, and the tables are accompanied by a few pages of explanations and remarks.

Part 2 of the *Verhandlungen* of the German Physical Society for 1914 contains a communication from Dr. G. Wiedmann and Prof. W. Hallwachs, of the Technical High School, Dresden, on the part played by the surrounding or absorbed gas in the production of the photo-electric effects exhibited by metals. Although the observations of Prof. Hallwachs and his pupils have all tended to show that the gas plays an essential part in the phenomenon, the idea that the photo-electric process is due to the metal only seems still to persist. With a view of showing how far such an opinion is out of touch with the actual facts the authors have by repeated distillations of potassium got rid of the large amount of hydrogen dissolved in the metal, and have shown that the reduction of the gas is accompanied by a decrease of the photo-electric action. After the fourth distillation the effect was reduced from a current giving 850 mm. deflection to one too small to detect. The result amply confirms the view that the effect is due to the gas absorbed by the metal.

THE inaugural lecture delivered by Dr. W. C. McC. Lewis, the successor of Prof. Donnan in the Brunner chair of physical chemistry at the University of Liverpool, has been issued in pamphlet form, with the title, "Physical Chemistry and Scientific Thought." It is mainly devoted to the significance of research from the purely scientific aspect, especially in connection with some of the problems of physical chemistry.

SINCE Wöhler's first synthesis of a natural organic compound, the chemist has succeeded in building up nearly all the natural compounds from their constituent elements in his laboratory; indeed, the synthesis of the sugars, the polypeptides, the alkaloids, uric acid and its derivatives are some of the greatest triumphs of the chemist. Much of the success in this field is due to the genius of Emil Fischer, and though he has celebrated his sixtieth birthday he shows no signs of relaxing his labours, being now responsible for another great achievement. The importance of the nucleus in the cell needs no emphasis, and therefore the value of the recent work, more particularly of Levene and his collaborators, in America, on its chemical composition has been widely recognised. In brief, the nucleic acids are composed of glucosidic compounds of purine derivatives combined with the carbohydrates to which phosphoric acid is also coupled. The synthesis of such a glucosidic compound of sugar and purine has long been essayed, but it is only now brought to a successful conclusion. Once the principle of the method of making them has been made clear all kinds of purine derivatives can be coupled with the carbohydrates, and when phosphoric acid has been introduced into the molecule the complete synthesis of the nucleic acids will have been achieved.

Engineering for March 13 gives an illustrated account of the new water supply scheme for New York. The actual water supply is derived from the Croton River by impounding this river and its tributaries thus providing 325 millions of gallons a day. The population has increased very rapidly, and the present consumption amounts to more than 500 millions of gallons daily. The additional water supply system, now under construction, is derived from the various watersheds of the Catskill Mountains, from which 800 millions of gallons daily could be obtained. The Esopus watershed is the only one to be developed at present, and has necessitated the construction of a great dam at Olive Bridge. This dam consists of a central masonry portion 1000 ft. long, and rising to a height of 210 ft. above the bed of Esopus Creek. Each end of the masonry is flanked by an earthen wing, which together are about 3600 ft. in length. The greatest thickness at the base is 200 ft., while the top, which is traversed by a roadway, is 26 ft. in width. The up- and down-stream faces are formed by concrete blocks of large dimensions, while the great bulk of the interior masonry is made of cyclopean concrete. Expansion joints are provided, and run through the entire thickness. The roadway on the top of the dam will be 20 ft. higher than the water level, and thus will be free from the action of ice and waves.

THE directors of Messrs. Pathé Frères have agreed to permit the Research Defence Society to hire any nine of their excellent medical and biological films for the modest fee of two guineas. Nine films afford ample illustration for a lecture of an hour's duration, and as a kinema machine can be hired in most large towns, it should prove possible, in view of the generous concession of Messrs. Pathé Frères, to arrange lectures in support of the work of the Research Defence Society at a comparatively small cost. Further particulars of this promising scheme for educating the public in the value of modern medical research can be obtained from the honorary secretary to the society, Mr. Stephen Paget, 21 Ladbroke Square, London, W.

MESSRS. LONGMANS AND CO. announce as in preparation, "Principles of General Physiology," by Prof. W. M. Bayliss. In the volume special attention will be given to reactions in colloidal systems, oxidation, action on surfaces, secretion, excitation, inhibition, nutrition, etc. Messrs. Longmans and Co. also give notice of a new series of monographs on physiology which will be under the editorship of Prof. E. H. Starling. The following volumes are in preparation:—"The Involuntary Nervous System," Dr. W. H. Gaskell; "The Physiology of Reflex Action," Prof. C. S. Sherrington; "The Conduction of the Nervous Impulse," Dr. K. Lucas; "The Physiological Basis of the Action of Drugs," Dr. H. H. Dale; "The Secretion of Urine," Prof. A. R. Cushny; "The Contraction of Voluntary Muscle," Dr. W. M. Fletcher; "The Cerebral Mechanisms of Speech," Dr. F. W. Mott; "The Chemical Mechanisms of Integration in the Animal Body," Prof. E. H. Starling.

OUR ASTRONOMICAL COLUMN.

ELECTRIC WAVES AND THE COMING TOTAL SOLAR ECLIPSE.—It is hoped that the forthcoming total solar eclipse of August 21 will be fully utilised to study the effect of the propagation of electric waves, as this event affords an exceptional and important opportunity of adding to the existing knowledge of the propagation of electric waves in sunlight and in darkness and across the boundaries of illuminated and unilluminated regions. The total eclipse track passes across Greenland, Norway, Sweden, Russia, and Persia to the mouths of the Indus; in Russia the duration of totality will be a little more than two minutes. A circular, distributed by the British Association committee for radio-telegraphic investigation sets forth details of this special kind of investigation and this committee would be greatly aided in the organisation of this piece of research if those possessing the necessary facilities and willing to make ob-